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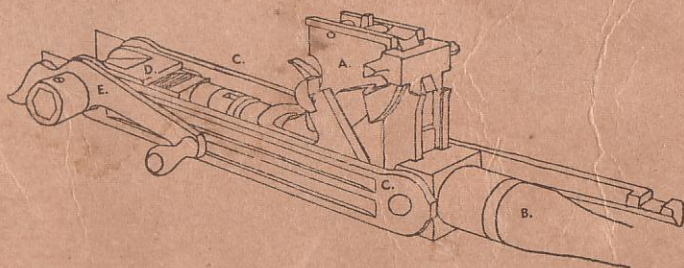


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# The **VICKERS GUN** **SIMPLIFIED**

**A POCKET BOOK AND  
ILLUSTRATED GUIDE**



**SECOND EDITION**

ROBERTSON & MULLENS LTD., Melbourne

**PRICE: ONE SHILLING AND SIXPENCE**



# The Vickers Gun

3099

## .303" VICKERS MACHINE GUN.

Weight (with water ) about 40 lbs. Rate of fire, about 500 rounds per minute. Belt fed.

System — recoil, assisted by muzzle gases — return action by spring. Automatic.

### 1. GENERAL.

The Machine Gun is the most powerful of all infantry weapons in defence.

Full and intelligent use only possible when capabilities and limitations thoroughly understood.

It is capable of producing concentrated, accurate and sustained fire beyond the usual range of rifles and light machine guns and does not present much of a target itself.

The **concentrated** effect of its fire is due to the nature of the mounting. The pattern made by the bullets hitting the ground fired at (beaten zone) is a long and narrow one, making the gun particularly suitable for enfilade fire, flanking protective fire (fixed line) and deep targets. The fire has limited effect on shallow targets, except at very close ranges.

The fire is **accurate** on account of the stability of the mounting and the reduction of the personal factor. To maintain this accuracy, however, the effect of side winds must be considered; good fire orders must be given by the leader; the gunners must have a high standard of fire discipline and ranges must be measured within a low percentage of error. At long ranges, a rangefinder is essential. By virtue of the instruments issued, accuracy can be produced and maintained when shooting by indirect means, when firing at night or when smoke, etc., obscures the target. The accuracy of the fire ensures that fire over the heads of our own troops can be produced safely and efficiently.

The fire can be **sustained** for a long period if required, on account of the strongly constructed mechanism of the gun; the length of belt issued and the fact that the gun is cooled by a supply of water. Cases have been recorded where guns have fired practically a belt per minute for one hour continuously.

The gun makes only a **small target** when suitably concealed, and only needs few men to maintain it in action — one man can manage for a period if ammunition, etc., is conveniently placed for him. To achieve the required concealment implies that the leader must study the ground carefully and select the most suitable position, and that the men at the gun must be fully trained to make the best use of the ground selected.

Limitations — Being a mechanical weapon, it is liable to suffer from a mechanical breakdown. The delay so caused can be reduced to a minimum by care of the gear and a high standard of efficiency on the part of the gunners. Training in applying remedies for such break-

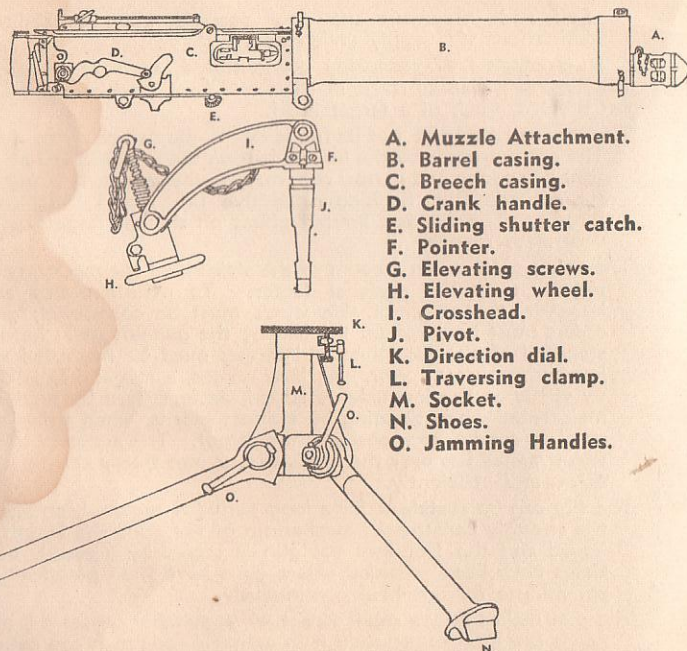


downs must also be carried out under night conditions to ensure complete success.

The water cooling system may, under extreme conditions, produce an emission of steam which would disclose the position of the gun. This effect can be eliminated by proper use of the condenser can and the exercise of initiative on the part of the gunners or the leader.

If parts which are in contact with the explosive gases — barrel, muzzle cup, muzzle attachment — are oily, smoke will be produced when fire is opened and nullify the efforts made to conceal the gun.

The noise made when the gun is firing is distinctive and liable to attract attention. A great deal of practice, however, is required to definitely locate a gun by this means. The frictional noise of the bullet's travel through the air ("crack") frequently misleads any but a highly trained observer.



- A. Muzzle Attachment.
- B. Barrel casing.
- C. Breech casing.
- D. Crank handle.
- E. Sliding shutter catch.
- F. Pointer.
- G. Elevating screws.
- H. Elevating wheel.
- I. Crosshead.
- J. Pivot.
- K. Direction dial.
- L. Traversing clamp.
- M. Socket.
- N. Shoes.
- O. Jamming Handles.

The muzzle gases may disturb the earth below and in front of the gun muzzle if the gun is set close to the ground surface, and so draw an observer's attention. Dust may be raised on soft ground or "blast marks" produced on hard ground. The use of wet bags, loose foliage or water on the ground affected, will normally prevent this happening.

The flash from the muzzle at night may be picked up by enemy observers when fire is opened at close ranges. The use of suitable screens and initiative on the part of the leader in selecting suitable positions, should adequately cater for this.

## DESCRIPTION OF PARTS.

### (A) Non-recoiling —

Barrel casing — cylindrical, with 2 end caps. Contains about 7 pints of water. End caps screwed on. Front cap contains internally, guide for barrel, seating for front packing, steam escape tube. Externally, screwed head of steam tube and fixing screw, steam escape boss and adapter, screwed emptying plug, foresight and protectors. A Gland screws into the front of the cap and positions the front barrel packing. Rear Cap contains internally, seating for rear end of steam tube, barrel bearing assembly. A steam tube is fitted inside the barrel casing (its rear end resting in a seating in the rear cap — its front screwed into the front cap), holes are drilled to enable steam to pass to the steam escape tube — a sliding valve (tube) preventing the water from entering the steam tube when the gun is depressed or elevated. A filling hole with screwed plug is arranged on the exterior of the rear end cap, to fill the barrel casing. A bracket is formed beneath the cap to accept the crosshead joint pin when the gun is attached to the mounting.

The muzzle attachment is attached to the Gland by means of interrupted flange engagement, being secured by a split pin inserted in corresponding upper holes in each component. The split pin is secured to the body of the attachment by a chain. Vents are formed in the body to permit exhaust gas being discharged. It is screw-threaded at the front end to accept the front cone. The front cone is a shaped steel internal cone fitted with an expendable metal disc on its rear face. The cone is drilled to allow the bullet free exit. Later patterns of front cone have a bullet proof facing. Both the Gland and the Front Cone are recessed to accept a combination tool, which ensures their correct tightness and adjustment.

Breech casing — rectangular — comprising Right and Left Side Plates, Front and Rear Covers, Bottom Plate, Sliding Shutter and Rear Crosspiece. Breech casing assembly is pinned to rear end cap of barrel casing assembly.

Right side plate is formed at forward end to receive the Feed Block. A Check Lever bracket is riveted on and carries the Check Lever. A slot is formed at the rear of the side plate for the movement of the Crank bearings; a grooved slide fitting into the rear of the slot. The slide carries the Roller which is held on by a Collar and Pin. The side plate is threaded to take the end of the "T" fixing pin. Left side plate also formed to receive the Feed Block. 2 studs are formed to hold the front end of the fuzee spring box. A similar slot is formed for the Crank bearings and a similar slide is fitted. The slide carries a stud for the rear end of the fuzee spring box. A "T" fixing pin passes through the rear of the side plate. A front cover catch is fitted at the forward end of the side plate.

Internally, both side plates carry a solid cam fitted with a step.

Front Cover. A stop is formed on its under side to act in conjunction with the Extractor. Front cover is hinged at its rear end to the rear cover by a screwed axis pin which also serves to connect the side plates. At its front end it is formed with 2 claws which connect with the front cover catch stem. The stem is formed with "flats"



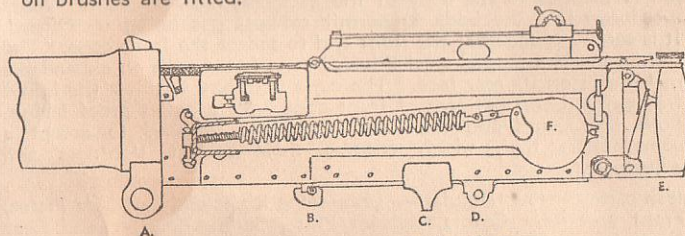
and when the catch is turned up the cover can be raised. A reverse movement locks the cover.

Rear cover carries the Tangent Sight with its Spring and Housing. At its rear end it carries a rear cover lock, formed with 2 claws, which connect with slots in the rear crosspiece. The lock is screwed to the rear cover by its screwed axis pin.

The rear cover is grooved on its under edges to fit over the side plates.

Internally, the rear cover carries the Trigger Bar in a prepared seating, the trigger bar Spring in its housing and the rear cover lock Spring in a housing. 2 ramps are fitted also under the rear cover to function in connection with the Extractors when the action of recoil occurs.

The Rear Crosspiece is in the form of a frame with 2 grips (or handles). It is attached to the bottom rear ends of the side plates by a screwed joint pin; its grooved lugs engage with the rear of each plate and is secured finally in assembly by the "T" fixing pin passing through the grooved lugs and the engagement of the rear cover lock of the rear cover. The rear crosspiece externally has fitted to it the Firing Lever with thumbpiece and pawl, safety catch with piston and spring, 2 wooden grips covering cylindrical oil bottles. The oil bottles are fitted with screwed caps to which oil brushes are fitted.



**Breech Casing — Left Side.**

- A. Crosshead bracket.
- B. Sliding shutter — on opposite side.
- C. Elevating stop.
- D. Elevating bracket.
- E. Rear crosspiece.
- F. Fuzee and spring assembly — cut view.

The Bottom Plate is pinned to the side plates. It is shaped to accommodate a Sliding Shutter fitted with a catch and spring. The shutter is kept closed (forward) when the gun is not required for use. A bracket is formed on the bottom plate to accept the elevating joint pin of the mounting when the gun is attached to the latter. A shaped Stop projects below the left side plate and prevents the fuzee spring box from being displaced or damaged when the gun is attached to the mounting and elevated.

#### (B) Recoiling —

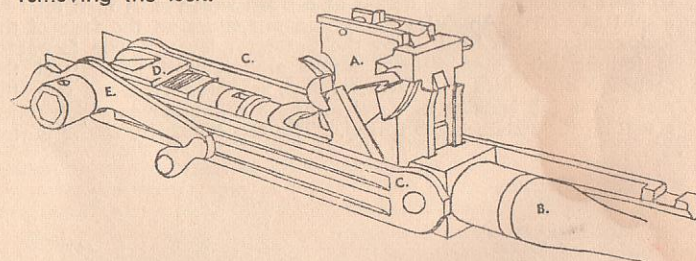
Muzzle Cup — Screws on to threads at muzzle of barrel, collects rebounded gases from front cone of muzzle attachment.

**Barrel** — Grooved on rear face of breech to accommodate Extractor Grooves and shaped to form a bullet "lead." Formed with circular trunnions at each side of breech barrel block to connect with right and left inside plates. A cannellure is formed round the barrel forward of this point into which is packed asbestos packing, which in conjunction with the shape of the barrel bearing in the rear end cap of the barrel casing, prevents the escape of water when the barrel recoils. The muzzle end is screwed to connect with the muzzle cup. Similar asbestos packing is packed around the forward end of the barrel (after assembly to the gun) and held in position by the gland in the front cap of the barrel casing.

**Right and Left inside Plates** — Both are similarly shaped except that the left carries an extension which functions in connection with the feed block assembly.

Shaped forward to attach to barrel trunnions; near the rear ends, to accept the crank and have extensions to prevent entry of dust, mud, etc. They are both formed with guides along which the lock moves. The guides are interrupted so as to permit of the removal and assembly of the lock. Each plate also carries a small shaped spring which engages with the lock extractor and ensure its height.

**Crank** — Connected to bearings in each inside plate; on right side has attached to it a curved crank handle secured by a screwed pin; on left side it is slotted to accept the fuzee. The crank is fitted with a crank pin to which is attached a connecting rod. A hole is bored in later patterns of the crank, to enable the use of a pullthrough with the gun assembled. A curved spring is also fitted in later patterns to hold the connecting rod vertical when attaching or removing the lock.



**PORTION OF RECOILING PARTS.**

- A. Lock.
- B. Barrel.
- C. Side Plates.
- D. Crank.
- E. Crank Handle.

**Crank Handle** — Fitted on shaped end of crank axle and secured by screwed pin. The crank handle is fitted with a circular knob at its forward end to facilitate handling. Its upper side is shaped and, working in contact with the Roller on the right slide, imparts an upward throw to the crank during the recoil action of the gun.

**Fuzee** — Fitted with a flat linked chain. Shaped to allow the chain to wind and formed with a stem to engage with recess in left side of crank axle. The stem has lugs to engage with internal recesses

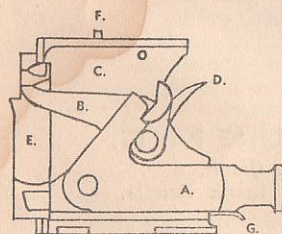


in the crank axle. The forward link of the chain is fitted with 2 trunnions which connect to hooks on the fuzee spring.

**Fuzee Spring** — A strong coiled spring fitted at rear end with 2 hooks; at front end is inserted a screwed plug which connects with a screwed stem to which is attached a vice pin. The fuzee and fuzee spring are covered by a shaped metal box formed with hooks to engage studs on the front end of the left side plate and a shaped recess at the rear end to engage against the stud on the left slide. The screwed stem passes through the front end of the fuzee spring box and is attached to the screwed plug in the front end of the fuzee spring. The vice pin is positioned against the front end of the outside of the box.

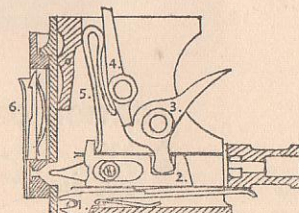
**Connecting Rod** — Attached to the crank by the crank pin. A shaped head with 3 lugs is formed to connect with the side lever head of the lock. An adjusting nut is assembled to the stem of the connecting rod. The fitting of prepared washers under the adjusting nut takes up loss of length due to wear. The connecting rod is milled on its upper side to facilitate handling when removing or replacing the lock.

**Lock** — Comprises a casing containing the Trigger, Tumbler, Lock Spring, Firing Pin, Sear and Spring, Trigger and Tumbler axis pins. The casing has guides formed at each lower side which work in conjunction with similar guides on each inside plate. The lock guides are similarly interrupted to facilitate removal or assembly. It is shaped to accept the Extractor and is formed with an extractor stop. At each side of the casing an Extractor Lever is attached to the Tumbler axis pin. Side Levers, attached to a shaped head, connect to the casing by means of a Bush which is in turn held by a split axis pin. An Extractor component slides on the face of the lock casing and is held up by the Extractor levers. The Extractor is formed with side flanges which are grooved to control the cartridge rim. Into the Extractor face is fitted a shaped Gib, the rear of the Gib housing being closed by a sliding cover which forms a seating for a shaped gib spring. The Gib holds the round during



**LOCK.**

- A. Side lever and head.
- B. Left extractor lever.
- C. Lock casing.
- D. Tail of tumbler.
- E. Extractor.
- F. Tail of trigger.
- G. Tail of Sear.



- 1. Sear with spring.
- 2. Firing pin.
- 3. Tumbler.
- 4. Trigger.
- 5. Lock spring.
- 6. Gib with spring.

the action of the gun's recoil and forward movement. The lock casing and extractor are drilled to allow the firing pin to contact the cartridge cap. The lock casing internally is shaped to accept its components and permit their functioning.

**Feed Block** — Comprising a shaped body fitted with guides; an upper lever; a lower lever; a slide fitted with pawls and spring; bottom pawls and spring. The cartridge belt is fed into the feed block and is controlled thereafter by the actions of the slide and pawls. The lower lever is formed with a stud which engages in the recess formed on the extension of the left inside plate and is therefore influenced by it. The lever fits through a housing on the body of the feed block and is shaped to connect with the top lever, the two levers being secured together by a split fixing pin entered from the top. The top lever is also formed with a stud which engages in a slot in the slide and imparts movement to the latter. The slide, on its under side, carries a pair of pawls mounted on small studs. A flat spring with two arms is fitted to control the pawls. Finger pieces project beyond the slide to enable pawls to be released from contact with the belt. A bent metal component, forming a pair of pawls and finger piece, are fitted into the bottom of the feed block on the right side. A curved spring is fitted in connection, the whole assembly being held by a long axis pin with a split shank and shaped head. Pressure on the finger piece releases the bottom pawls from contact with the belt. Cartridge and bullet stop are formed inside the feed block, preventing over-movement of the cartridge in feeding. The body of the feed block is made either in gun metal or steel, all components being interchangeable.

## THE MACHINE GUN MOUNTING.

(Mounting, tripod, Mk. IV) Weight — about 50 lbs.

**Crosshead** — Curved gunmetal arms formed with a shaped pivot at the forward end and a arm at the rear end into which the elevating gear assembles. The pivot fits into the socket and is controlled by the pressure of a traversing clamp in the latter. The crosshead has bearings above the pivot, and guides beneath the bearings, for the reception of a joint pin which secures the gun to the crosshead. An engraved spring plunger is fitted to the right forward side of the crosshead, to function against an engraved dial on the socket.

**Elevating Gear** — Consists of an inner and outer screw (right and left handed respectively) working in a nut which is fixed inside a large metal tumbler. The latter is split and fitted with a jamming bolt to tighten it. A chain connects the inner screw and crosshead to prevent loss of the former. The elevating gear is moved by an engraved wheel marked off in suitable divisions up to 4 degrees. The wheel is attached by a circular nut and a feather. An elevating joint pin and a crosshead joint pin are secured to the crosshead (and elevating gear) by means of chains. The head of the inner screw is formed to fit between the elevating bracket on the breech casing and to accept the joint pin.

**Socket** — A solid metal casting bored to accept the pivot and formed with 3 lugs to which the 3 legs of the tripod are attached. On the front of the socket is fitted a jamming block with screw and handle (traversing clamp) which operates in a shaped groove on the pivot and controls the lateral movement of the crosshead and gun. The



faces of the lugs are fitted with serrated clutch plates which agree with similar fittings on the leg joint faces.

An engraved dial is fitted on the top of the socket and secured by set screws. The dial is marked to 180 degrees each side of zero and is fitted with an underneath clamp which controls the rotateable engraved ring of the dial.

**Legs** — Both front legs are similar in shape and attach to the forward lugs of the socket on either side. A jamming handle and disc spring ensure their engagement with the socket clutch plates. The rear leg is fitted with a forked end to engage both sides of the rear lug on the socket and has a tubular jamming handle free to move. All legs are fitted with suitable shoes to grip the ground surface, and have graduated marks at their forward ends to register against a zero mark on the socket lugs.

### ELEMENTARY TRAINING.

**To load the gun** (the sliding shutter having been drawn to the rear).

Raise the crank handle and hold it fully back. Draw the belt through the feed block until the 1st round is against the cartridge and bullet stop. Let the crank handle fly forward. Draw the crank handle again to the rear and hold it. Draw the belt again as before. Let the crank handle fly forward.

The withdrawal of the crank handle draws back the lock and cocks it, the action also allows the cartridges to pass to their correct position. The release of the crank handle allows the lock to go forward and the extractor is now gripping the 1st round. Repeating the action withdraws the 1st round, feeds the 2nd round into position and finally results in the 1st round being placed in the chamber and the 2nd round gripped by the extractor.

When loading without the assistance of another person, the end of the belt is first passed through the feed block and held with the left hand; before withdrawing the crank handle. The belt must pass through the feed block at right angles. Do not retain tension on the belt after the round has been correctly positioned. All actions should be smooth and in above sequence.

**To fire the gun.**

Holding the rear wooden handles (traversing handles) with the forefingers over the top arms of the frame, raise the safety catch with the 2nd fingers and press the thumbpiece of the firing lever with both thumbs. The gun will now fire automatically and continue until

- (a) the pressure on the thumbpiece is released — in which case the gun will stop firing and remain loaded. A further pressure will again initiate firing.
- (b) the allotted rounds have been fired — in which case the gun will stop firing and be clear.

**To unload the gun.**

Draw the crank handle to the rear and release it. Repeat the same action. Place the fingers of the right hand on the finger pieces of the upper pawls of the feed block, whilst the thumb is placed on the finger-piece of the lower pawls. Pressing the finger-pieces frees the belt which is withdrawn and repacked in its box. The safety catch being kept raised, the thumbpiece is pressed, releasing the lock spring.

When unloading without assistance, the belt is withdrawn by using

the left hand. Do not pull the belt in any direction whilst the crank handle is being manipulated.

The first withdrawal of the crank handle clears the round from the breech and withdraws another round from the belt. Releasing the crank handle places the latter round in the breech. Repetition of the actions removes the round from the breech and clears the gun. The belt not having been pulled, no rounds are fed into the feed block.

### STRIPPING AND ASSEMBLING.

#### (A) THE GUN.

Gun first unloaded.

Draw crank handle on to roller — raise rear cover — hold the lock casing between thumb and fingers, with one finger pushing the extractor down — ease the crank handle forward gently until the lock guides are freed from the side plate guides — lift the lock upwards — turn it slightly to release it from the connecting rod, and remove it. Ease crank handle forward on to check lever.

Move to the front of the gun. Withdraw the muzzle attachment split pin — turn the outer casing to disengage the interrupted flanges and remove the outer casing. Unscrew the muzzle cup and remove it.

Come to the rear of the gun. Turn the front cover catch up and raise the front cover. Lift out the feed block — close the front cover and turn the catch.

With the right hand at the rear of the fuzee spring box and the left hand near the front, press the box forward until the hooks, etc., are clear of the studs on the side plate and slide. Unhook the fuzee chain from the spring. Turn the fuzee towards the rear until the stem lugs are clear and remove it from the crank axle. Place it in the open box for convenience.

Raise the rear cover — unscrew the "T" fixing pin — lower the rear crosspiece carefully — slide off both sides — swing the crank handle back so that the connecting rod lies in the crank arms — grasp each side of the crank axle and withdraw the remaining recoiling portions — when the barrel trunnions are clear of the breech casing, lift off the side plates from the crank axle and barrel trunnions, taking off the left one first. Remove the barrel.

Replace in reverse order.

When replacing the barrel, ensure that the groove ("bullet lead") is uppermost and that the side plates are correctly fitted. Use no force. Everything should assemble smoothly. If there is any check, there is something being done wrongly.

#### (B) COMPONENTS.

- i. The Lock — Fully cock the lock, e.g., engage sear and firing pin bolts. Using a suitable tool ("T" fixing pin or No. 5 Punch) push out the split axis pin of the side levers — push out the bush — take off the side levers and extractor levers — slide off the extractor. Take out the axis pin of the tumbler and remove the tumbler. Holding the casing so that no part of the hand is in front of the firing pin hole, press down the tail of the sear. Push out the axis pin of the trigger — remove the trigger, firing pin, lock spring and sear. Push off the sliding gib spring cover and take out the gib spring and gib.

To assemble — reverse the above operations, except that the



tumbler is replaced before the trigger and the lock spring goes in last when all other parts are correctly fitted. When putting in the lock spring, have the side lever head fully down, tumbler tail down and trigger tail back. The long arm inserted first, care being taken not to raise the side lever head when pressing the spring down otherwise the spring will not seat correctly behind the projection on the firing pin. Best done with the lock resting on a flat base, the left hand holding the top rear corner of the casing, whilst the spring is forced down by the palm of the right hand. After spring is assembled, test by cocking the lock, holding the extractor fully up, depressing the sear and tripping the tail of the trigger by hand (or suitable tool).

- ii. The Feed Block — Using a suitable tool ("T" fixing pin or No. 5 Punch) push out the split pin securing the top and bottom levers. Separate the two levers (this may need a slight tap with a wooden handle). Take out the slide — ease off the pawls and remove the spring. Draw out the axis pin holding the bottom pawls and spring. Assemble in reverse order. Use no force.
- iii. Sliding Shutter — Press in the catch and draw the shutter forward to its stop, then press in the plunger on the reverse side and ease the shutter forward until clear. Assemble in reverse order.
- iv. Front cover catch — Push the plug inwards and give it  $\frac{1}{4}$  turn to free it, it should be forced out by its spring — remove the spring — turn the plunger so it is free to move past the inner lugs, and remove it. Assemble in reverse order.
- v. Rear cover lock — Unscrew the screwed axis pin and remove it. Ease off the cover lock and, using a punch or blunt drift, ease the spring from its housing. When assembling the spring, guide the legs into their housing and tap the spring down gently with a wooden handle. Ease the blade of the cover lock under the head of the spring and position the lock correctly for the screwed pin.
- vi. Trigger Bar — Take off the rear cover lock. Remove the trigger bar spring from its housing and draw out the trigger bar. Reverse operations to assemble.
- vii. Roller — Remove the split fixing pin — take off the collar and remove the roller.
- viii. Tangent Sight — Have sight horizontal — keep pressure on rear of sight and unscrew axis pin and remove tangent sight, piston and spring.

### CARE AND MAINTENANCE.

#### Cleaning the barrel — gun mounted.

Remove the lock, take off the muzzle attachment and cup. Using a dry piece of flannellette (4 in. by 2 in.) in the eye of the cleaning rod and placing the bush over the muzzle, insert the rod from the muzzle end and clean the barrel with successive pieces of cloth until satisfied by inspection, that the barrel is clean.

When oiling the barrel after use, a smaller piece of flannellette well soaked in oil, is used.

#### Cleaning the barrel — out of the gun.

Similar procedure but ensuring that barrel is firmly held. Rod to be inserted from breech, end of rod covered by cleaning material.

#### Using the pullthrough.

The pullthrough provided in the spare parts kit can be used either when the gun is mounted or when the barrel is out of the gun. Essential to ensure that the cord is free from dirt and in good condition; that the brass weight is not bent; that the gauze is slightly oiled and fits the bore and that the cord is kept taut whilst being pulled backwards and forwards through the barrel. If the barrel is out of the gun it must be held firmly. If the barrel is in the gun it will first be necessary to remove the lock, lower the rear crosspiece and temporarily release the elevating connection to allow the cord to be passed through the barrel.

#### Weighing, etc. — the Fuzee Spring (to be between 7 to 9 lbs.).

Remove the lock. Attach a loop of the spring balance to the crank handle knob. Draw the spring balance directly upwards until the crank handle commences to move from the check lever. To increase the weight recorded, turn the vice pin at the fuzee spring box outwards — 6 half turns (clicks) equal about 1 lb. To reduce the weight recorded — reverse the procedure.

#### To weigh the recoiling portions (not to exceed 4 lbs.).

Remove the fuzee spring and box. Raise the crank handle to a vertical position or nearly so. Attach a loop of the spring balance to the right crank axle and draw slowly to the rear. Read scale at time of first movement of parts backwards. If above 4 lbs. it is necessary to work the friction down — probably due to tight packing. Oil the packing (front and rear positions), hold the crank axle at each side and work the recoiling portions backwards and forwards frequently. Test and adjust until weight reduced.

#### To weigh the lock spring (to be between 12 to 14 lb.).

Fully cock the lock and place it upright on a flat surface. Attach the loop of the spring balance to the side lever head and rest the other hand on the top of the lock. Slowly draw the balance upwards, when the tumbler commences to move read the scale.

#### Preparing the gun for firing.

Examine and clean all parts before assembly — dry out the barrel, muzzle cup and the muzzle attachment — ensure muzzle cup screwed on correctly, also front cone — fill the barrel casing with water — oil the recoiling portions, cover ramps and trigger bar — weigh the recoiling portions, fuzee spring, lock spring.

Ensure oil in traversing handles and spare parts case.

Ensure spare parts correct.

Check over Condenser can, fill with water — Condenser tube (attach to gun) — tripod mounting and belt boxes.

#### During firing pauses.

Watch water supply in barrel casing — keep belt box in line with feed block and close up — oil bearings of barrel — recoiling portions — cover ramps and trigger bar — ensure that front cone, muzzle cup and tripod jamming handles are tight and sufficient water in condenser can. Ensure that all repairs adjusted where necessary.

#### After firing finished (on firing range).

Unload — take off the lock, muzzle cup and muzzle attachment. Clean the barrel with the rod, first with dry then with oiled



flannellette, then with dry. Use the pullthrough to get rid of any "nickelling" in the barrel.

Oil the lock, muzzle cup and attachment.

Oil the barrel with the rod — it should now be cool enough to hold the oil.

Re-assemble the gun and pick up the empty cases and unfired cartridges — separate each.

#### When back in camp, etc.

Strip and clean all parts — take weight off fuze spring — release the water from the barrel casing and allow the air to circulate through the casing. Check up on the belts, mounting and all stores.

Notes — Special oil is now issued which, when used in the barrel and other gas-affected parts, obviates continual cleaning after firing. It is applied to the parts affected by gas immediately after firing and counteracts the corrosive effect of the gas. It will not prevent "nickelling."

Graphited grease will probably be issued for lubricating the working surfaces of the gun instead of lubricating oil.

Water can be released from the barrel casing after firing, whenever considered most suitable.

### INSTRUCTION IN AIMING.

Instructor demonstrates and explains how to adjust the tangent sight.

Adjusted in multiples of 50 yds.

Top edge of slide in line with the line under the range figure required.

Practise the men making a variety of adjustments, i.e., "800" — "1,150", etc.

Instructor explains and illustrates the rules for aiming:—

Sights to be upright — this is decided by the correct mounting of the tripod.

Eye close to the aperture as possible — both eyes may be open if desired.

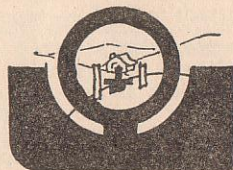
Look through the aperture and not at it.

Tip of foresight to be in centre of aperture and aligned on centre of target (when aiming at targets which are fitted with an aiming mark, e.g., range practice targets, aiming post or aiming lamp the aim will be layed at the centre of the lowest edge of the aiming mark).

Instructor explains and demonstrates the following (aim layed at clear aiming mark):—



Correct Aim  
Lamp or Post  
(6 o'clock).



Correct Aim  
Natural Target  
(Centre).

i. Laying without holding — chin supported by the hand, arms rested on belt box. Direction obtained by tapping the traversing handles; elevation obtained by turning the elevating wheel. All men look over the sights and appreciate the aim — then practise laying.

ii. Laying with holding — all play taken up by pressure on traversing handles. Men look over sights, supporting their heads by suitable means so as to get a steady view. Each man then practised.

iii. Laying on natural objects in a landscape (or on a landscape target).

iv. Noting a point of aim off a target — Instructor taps the gun off a natural target and men look over sights and describe where the gun is now laid. Explain that this point is known as an "auxiliary aiming mark."

v. How to pick up a "gun aiming mark" above or below a given target. The gun is layed on a natural target; the gunner holds the gun correctly with one hand whilst with the other he manipulates the slide up or down until the line of sight is on a suitable mark on the gun's line. Gun elevation or direction not to be altered. He then indicates the "gun aiming mark" and reports the tangent sight setting.

Instructor explains the use of the Battle Sight — for short ranges and emergency.

If men do not appreciate their laying error — hold a piece of paper in front of their foresight and ask them to adjust their view so as to get the sights correctly aligned, then quickly lower the paper and after a slight pause, obscure the view again. The first "flash" they get of the aligned sights against the target should convince them.

### SUGGESTED INITIAL TRAINING FOR MACHINE GUNNERS.

#### 1st Period.

Introduction to the gun and gear — brief explanation, e.g., name of gun, weight of major parts, system, rate of fire, etc.

Explain — the Belt, how it is filled and packed in belt box, etc.

Practise each man with a few rounds, placing them in the belt.

Demonstrate and explain how the gun is correctly held —

Demonstrate and explain — how to load the gun (individual effort) —

Demonstrate and explain how to unload the gun (individual effort) —

Practise all men at the above actions.

Illustrate and explain how the tangent sight is set at various settings.

Practise a few men.

Illustrate and explain what a correct aim looks like — without holding.

All men study diagram and gun aim.

Demonstrate how the gun is fired — practise men in necessary action.

Question and practise men in any of the above until time limit of lesson.

Whenever necessary, name the gun part being handled or affected during the lesson, e.g., when teaching how to load "seize the knob of the crank handle—this is the crank handle and this is the knob."

#### 2nd Period.

Firing on a short range — no target required — suitable stopbutt necessary.

Arrange previously for a prepared gun and ammunition — arrange belt so that cartridges are in groups of 10 with a space between each 10.



Instructor demonstrates the full action required of the men —

- Loading the gun.
- Setting sight and laying (at a central spot in a suitable stop butt).
- Firing a burst of 10 rounds.
- Loading the gun again.
- Checking aim again.
- Firing another burst of 10 rounds.
- Unloading the gun.

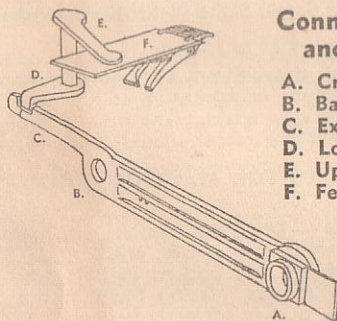
Each man now goes through the above programme, guided by the Instructor.

### 3rd Period.

Stripping, Cleaning and description of the gun and its parts.

The firing having been completed, the Instructor should demonstrate and explain how the gun is stripped down — mentioning each part by name as he handles it and questioning the squad — he should then demonstrate how the gun is cleaned after firing and finally, how the gun is assembled again.

Men now have an interest in the gun and can appreciate more of its action. The normal detailed instruction can now be undertaken.



**Connection — Left Inside Plate and Feed Block Slide, etc.**

- A. Crank bearing.
- B. Barrel trunnion recess.
- C. Extension to side plate.
- D. Lower lever of feed block.
- E. Upper lever of feed block.
- F. Feed block slide with pawls.

### GENERAL MECHANISM.

The recoil from the 1st round fired, acting against the lock face, causes the recoiling portions to travel to the rear, this movement is assisted by the action of the gas at the muzzle which is caused to rebound off the front cone on to the muzzle cup.

The curved tail of the crank handle, acting on the roller, imparts a lifting action to the crank, withdrawing the lock, cocking it and winding the fuzee chain around the fuzee and so extending the fuzee spring further. The extension of the left inside plate draws the lower lever of the feed block to the rear thus imparting a movement to the top lever which moves the slide to the right, allowing the pawls attached to the slide to ride over and engage behind the next cartridge in the belt which is held by the bottom pawls.

The movement back of the lock ensures the empty case being withdrawn from the breech and a round (already gripped by the extractor) from the feed block. Horns formed on the extractor travel on the upper surfaces of the cams formed on the inside of the breech closing side plates, and are then forced to drop by the influence of the

curved ramps on the under side of the rear cover. The dropping of the extractor releases the empty case from the gun normally, and brings the "gripped round" into line with the breech chamber.

The cocking of the lock is effected by the upward lift of the crank, connecting rod and side lever head. The side lever head, pressing upwards the tail of the tumbler, causes the tumbler to rotate, thus withdrawing the firing pin. The action continues until the bent under the firing pin is brought to engagement with the bent on the sear. During this action, the nose of the trigger has been forced by the short arm of the lock spring, over the bent of the rotating tumbler and the lock spring has been compressed by the backward movement of the firing pin, the long arm of the lock spring being against the projection on the forward end of the firing pin. The sear spring ensures that the bent of the sear will engage against the bent of the firing pin.

The momentum of the recoil action, the continued rolling of the crank handle surface against the roller and the tension of the fuzee spring, causes a "throw" to the crank which forces the recoiling portions forward again unwinding the fuzee chain from the fuzee. The lock continues to move back slightly owing to the "throw" before joining the forward movement.

The movement forward of the recoiling portions causes the left side plate extension to act again on the lower lever of the feed block, drawing it forward. The result is that the slide is moved back to its original position again. The movement of the slide brings another cartridge into position correctly in the feed block, being carried over in the belt by the upper pawls attached to the slide. The belt in moving depresses and rides over the bottom pawls (the belt passing between the pawls, the cartridge controlled by the upper pawls acting on the bottom pawls). The bottom pawls rise again under the influence of their spring and engage behind the next cartridge, holding it and preventing the belt from "running back."

The "throw" or forward rotation of the crank forces the lock forward and the crank handle on to the check lever. The lock extractor places the "gripped round" into the chamber and is then forced to rise under the influence of the extractor levers, which are in turn actuated by the side levers, i.e., the crank rotating forward, lowers the connecting rod and side lever head, causing the side levers to act on the extractor levers. During this rising movement of the extractor, the round in the chamber is slipped off the gib as the latter rises, being still held by its rim riding in the extractor cartridge grooves. The rising extractor engages the cartridge brought into position in the face of the feed block, the upper projection of the gib riding under the base of the cartridge and finally engaging it. When the extractor is fully "up," the side plate springs engage in lower recesses of the extractor and ensure its height (particularly in the case where no rounds were held, e.g., an empty gun) and the steps of the side levers engage over the bents of the extractor levers. By this time the lock has been forced fully home against the breech, the firing pin hole in the extractor is opposite the cap of the cartridge in the chamber and the side lever head has gone down slightly below the horizontal.

This last movement of the side lever head depresses the tail of the sear, releasing the bent of the sear from the bent of the firing pin. This depression is timed to occur only when the lock is fully home and

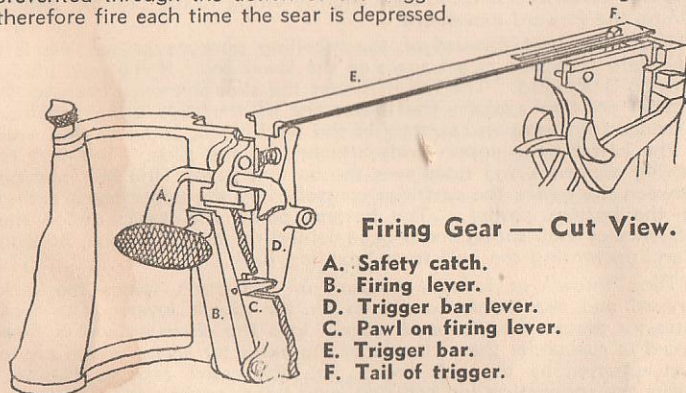


ready for firing. The nose of the trigger comes in contact with the bent of the tumbler.

#### Action of firing mechanism.

The pressure on the thumb piece of the firing lever causes a pawl on the latter to act on the bottom of the trigger bar lever. This component is pivoted in the centre, consequently the top moves to the rear. In doing so, it draws back the trigger bar and compresses the trigger bar spring. The end of the trigger bar slot is brought into contact with the tail of the trigger and draws it to the rear causing the nose of the trigger to become disengaged from the bent of the tumbler and allowing the lock spring to force the firing pin forward and contact the cap of the cartridge in the chamber.

If the thumb piece pressure is maintained, the trigger bar is kept drawn to the rear, consequently when the lock goes forward the end of the slot trips the tail of the trigger before the lock is quite home. The sear is finally depressed, releasing the firing pin. The bent of the tumbler cannot be engaged by the trigger owing to the latter being prevented through the action of the trigger bar slot. The gun will therefore fire each time the sear is depressed.



**Firing Gear — Cut View.**

- A. Safety catch.
- B. Firing lever.
- D. Trigger bar lever.
- C. Pawl on firing lever.
- E. Trigger bar.
- F. Tail of trigger.

If the thumbpiece pressure is released, the trigger bar spring pushes the trigger bar to its original position. Consequently, when the lock is going home, the end of the slot cannot affect the tail of the trigger. The sear is depressed, the lock spring commences to force the firing pin forward thus rotating the tumbler and the nose of the trigger comes into engagement with the bent of the tumbler and prevents any further action. Pressure on the thumbpiece in turn draws back the trigger bar, the end of the slot contacts the tail of the trigger causing the nose to release the tumbler and the firing pin is again free to move forward on to the cartridge cap under the action of the lock spring. Therefore the 1st round of each burst is effected through the depression of the sear; following rounds are fired through the depression of the sear.

Notes — In teaching mechanism, it is desirable to divide into suitable stages, as under:—

1. Backward Movement — dealing with the initial recoil effect and its influence on the feed block.

2. Rotation of the Crank — dealing with the effect of the crank handle on the roller with respect to the crank, lock, fuze — also the forward "throw" of the crank and the effect on the recoiling portions and feed block.
3. Backward Movement of Lock — the effect of the lock's movement on the cartridge and empty case held by the extractor, also the cocking action inside the lock (a skeleton lock or diagram is desirable if available).
4. Forward Movement of Lock — how it effects the movement upwards of the extractor and cartridges — effect on fuze when lock moves forward.
5. Firing Action — the effect inside the lock and the chain of communication from thumbpiece to tail of trigger.

To deal with

- (1) An empty case and full cartridge on face of extractor. Fuze spring and muzzle attachment removed after above preparation and lock spring released. Push recoiling parts back by pressure on muzzle cup — rear cover raised. Use spare feed block and cartridge.
- (2) Similar preparation, then complete action by pressure on crank handle.
- (3) Similar preparation but draw recoiling portions back slowly.
- (4) Half load — take off fuze spring box and spring — crank handle on to roller and pull belt — raise rear cover. Force the crank handle down on to the check lever.
- (5) Half load — remove trigger bar — pull crank handle on to the roller and pull the belt — raise the rear cover. Lay trigger bar in position over tail of trigger.

Always demonstrate actions clearly and advise the men what they are to watch. Repeat demonstrations with necessary explanations and continually question men as to action.

#### ELEMENTARY GUN DRILL.

Gear laid out facing suitable direction, as under — Tripod, folded and with legs to rear and crosshead over rear leg. A short distance to the right the gun is placed with the muzzle to the front, the gun rested on its left side (crank handle uppermost), the condenser tube (or dummy tube) attached and laying along the gun. The spare parts case against the gun. A short distance in rear of the gun and tripod are placed the condenser can and 2 belt boxes. The condenser can being on the right and about a pace from the boxes.

The detachment of 3 men "fall in" a few paces in rear of the condenser and belt boxes. They are numbered off. Any remaining personnel are placed so that they can see all actions.

The instructor demonstrates and explains whatever action he wishes carried out.

#### TAKE POST.

No. 1 moves quickly to the tripod and assumes a position on its left (lying). He examines the tripod to see that the pins are in and both turned down, the elevating screws are equally exposed, the



traversing clamp sufficiently tight to prevent the crosshead swinging when being carried, direction dial securely fitted, all 3 legs together and clamped and the crosshead over the rear leg. When both the other Nos. have reported to him, he reports "All Correct" (or otherwise) to the Instructor.

No. 2 turns to the right and moves quickly to his position on the right of the gun. After lying down he puts the strap of the spare parts case over his right shoulder and inspects the gun to see that the muzzle attachment is correctly attached, condenser tube fitted, feed block is in the gun, front cover locked, sliding shutter closed, tangent sight set at 600, that the lock is in the gun and the "T" fixing pin home and vertical. He reports to No. 1 "Gun Correct" (or otherwise) on completion of his inspection.

No. 3 turns to the right and moves quickly to his position, lying between the condenser and belt boxes. He inspects the belts to see that they are correctly loaded and pointing the correct way. He closes and fastens the boxes. He inspects the condenser to see that the cap is screwed on and that the filler is secure. He reports to No. 1 "Ammunition and Condenser Can Correct" (or otherwise) on completion of his inspection.

All Nos. now lie facing forward with arms folded. To change the numbers round the Instructor orders "Fall Out 1." No. 1 then becomes No. 3 and so on, the detachment re-numbering. When explaining an action, the order "Rest" should be given. The order "Position" will bring the detachment back to their original condition. Duties of No. 1 should first be taught and practised by all before dealing with those of Nos. 2 and 3.

The Instructor will indicate the position over which the mounting is to be erected and the direction in which the gun will point. The position should be only a few yards in front of No. 1.

#### **MOUNT GUN (Tripod).**

No. 1 jumps to his feet, grasps the crosshead with the right hand near the pivot and carries the tripod forward to the spot indicated by the Instructor. He places the tripod on the ground, stands astride the legs, loosens the jamming handles simultaneously and, grasping the crosshead near the pivot with both hands, with a forward and upward movement he spreads the front legs. He keeps the shoe of the rear leg on the ground, holds the crosshead with the left hand (supported by the left thigh) and tightens each jamming handle with the right hand. He then sits down behind the tripod and removes both joint pins, turning them up towards himself before withdrawing them.

#### **DISMOUNT GUN (Tripod).**

No. 1 replaces both pins, turning the handles down towards him. He stands up astride the rear leg, releases both jamming handles simultaneously and allows the tripod to collapse. Grasping the crosshead with both hands near the pivot, with an upward and forward movement he folds up the front legs and tightens the jamming handles. He then assumes his position lying on the left of the tripod and re-conditions it. When working in rooms where the floor would be damaged or in bad ground or at night a suggested method is to hold the crosshead with the left hand, loosen the jamming handles and

swing the tripod back, pivoting it on the rear leg, then clamp the jamming handles and place the tripod in suitable position according to conditions.

The tripod is left mounted after all numbers have been practised in the above. One number is left in position behind the tripod, holding both pins out.

#### **MOUNT GUN (Gun).**

No. 2 opens the sliding shutter, jumps to his feet and picks up the gun with the left hand at the right traversing handle (also including the condenser tube) and with the right arm over the barrel casing. He doubles forward to the tripod, sinks on the left knee and places the gun in position. He takes the crosshead joint pin from No. 1 and secures the gun to the crosshead, turning the handle of the joint pin down. He then releases the traversing handle with his left hand, swings the condenser tube forward and lies down on the right of the gun, looking towards it with his head in line with the feedblock but below it.

#### **Further Duties of No. 1.**

No. 1 hands No. 2 the crosshead joint pin and grasps the left traversing handle with his left hand. When No. 2 has secured the gun to the crosshead, No. 1 inserts the elevating joint pin and turns the handle down towards himself. He then levels the gun and tests by tapping the handles whether the traversing clamp is reasonably tight. He holds the gun with both hands correctly, elbows inside his thighs and feet braced and looks at the target or direction the gun is pointing. No part of his body should be in contact with the tripod.

#### **DISMOUNT GUN (Gun).**

No. 2 jumps to his feet and after No. 1 has removed the pins he seizes the gun in the same manner as when mounting, also including the control of the condenser tube, and lifts it clear of the tripod. Moving slightly to the right, he closes the sliding shutter and places the gun on the ground and assumes his original position beside it, re-conditioning it as necessary. All numbers should be practised in carrying out mounting and dismounting gun.

Two numbers now act as Nos. 1 and 2 and mount the gun on the tripod.

#### **MOUNT GUN (Condenser and Belt Boxes).**

No. 3 disengages the quick release straps of the belt boxes and unscrews the cap of the condenser can except for a half turn. He jumps to his feet and doubles to the right side of the gun, carrying with him the condenser can and both belt boxes, the condenser can being in his right hand. He places the Can near the front of the tripod in a suitable position for No. 2, and the belt boxes in an easy position for No. 2, with the fastenings towards the gun. He unscrews the cap of the condenser can and doubles back to a suitable position in the right rear of the gun and lies down.

#### **Further Duties of No. 2.**

No. 2 positions a belt box in line with the feed block and close to it and inserts the end of the condenser tube in the can.



### **DISMOUNT GUN (Condenser and Belt Boxes).**

No. 3 doubles forward, seizes the condenser can and belt boxes as before and retires with them a few paces in rear of the other numbers. He lies down between them and re-conditions them to their original condition.

### **Further Duties of No. 2.**

No. 2 pushes the belt boxes clear and withdraws the condenser tube from the can before attending to the gun.

All numbers are practised in handling the condenser can and belt boxes.

With 3 numbers in position, order "Dismount Gun."

When completed, the order "Replace Stores" ensures that all gear is returned to the "Take Post" position.

Detachments are then practised in carrying out complete actions in sequence on the orders "Mount Gun" and "Dismount Gun."

### **LOAD.**

No. 1 pulls crank handle on to roller with right hand and extends the left hand opposite the left side of the feed block.

No. 2 throws the lid of the belt box open, seizes the tag of the belt and pushes it through the feed block.

No. 1 grasps the belt, pulls it until the 1st cartridge is positioned, releases tension on the belt and lets go the crank handle. He repeats the action again with crank handle and belt.

No. 1 must pull belt straight through and not towards himself. No force is necessary, the actions should be smooth and in above sequence.

No. 2 must push the tag as far through as possible so that No. 1 can grasp it firmly. The forefinger along the tag is a suitable method.

Recruits may have to be taught by numbers, e.g., "Crank handle" — "Pull Belt" — "Let Go" (repeat).

### **UNLOAD.**

No. 1 pulls the crank handle on to the roller and releases it. He repeats the action. He extends his right hand to the right side of the feedblock, placing the fingers on the finger-pieces of the top pawls and the thumb on the finger-piece of the bottom pawls, pressing both, taking care to keep his hand clear of the feed block opening.

When the belt is withdrawn with the top round clear of the feed block opening, he presses the thumbpiece with the left thumb, holding the traversing handle with remaining fingers.

No. 2 withdraws the belt with his right hand, steadying it with his left and replaces the belt correctly in the box, closing the lid with the right hand, but not fastening it.

Should the sight have been in use when ordered to "Unload," No. 1 will knock it down with his left hand at the same time as he functions with the crank handle. He then regains control of the gun with his left hand ready to release the lock spring.

### **ACTION.**

On the order "Action" the sequence of actions taught in "Mount Gun" and "Load" are carried out.

### **CEASE FIRING.**

On this order, the sequence of actions taught in "Unload" and "Dismount Gun" are carried out.

### **CLEAR GUN (the gun being mounted and unloaded).**

No. 1 pulls the crank handle on to the roller, opens and raises the rear cover, removes the lock from its guides, eases the crank handle on to the check lever and allows the lock to rest upright against the hinge of the cover. He then reports "Gun Clear."

Should gun be loaded, order "Unload" before giving "Clear Gun."

### **STAND CLEAR.**

Nos. 1, 2 and 3 jump to their feet and "stand at ease."

Order "Take Post" for gun numbers to resume former positions.

Order "Lock in — Cover Down" or "Load" (Lock must be properly down before cover is lowered).

**SETTING SIGHTS AND LAYING** (Lessons in Aiming must have been taught prior to this stage).

3 simple targets made known to all — e.g., "Track" "Corner" "Shed."

Gun loaded and Nos. 1 and 2 at gun.

Order "1,000 — Corner — Lay" (or similar order).

No. 1 raises and sets the tangent sight. When "Lay" is ordered he begins to lay his gun at the target named (by tapping the traversing handles with one hand whilst the other keeps control of the gun) until direction is obtained. He then moves the elevating wheel until the sights are correctly "on". He then calls out "ON" and No. 2 places his left hand out behind the shoulders of No. 1 and watches the fire controller.

Should No. 1 not understand the order he calls out "Repeat."

### **FIRE, STOP and GO ON.**

On the order "Fire," No. 1 (who should have the correct holding with safety catch raised) will press in the thumbpiece without altering the gun's line or elevation. He must look directly at the target and fire in bursts of about 4 to 5 seconds, releasing pressure on the thumbpiece after each burst and checking his aim. No. 2 will lower his hand on the order "Fire."

On the order "Stop," No. 1 releases the pressure on the thumbpiece and lets the safety catch drop. He should check his aim and relay on the point taken for the first burst. The instructor should disturb the gun's line and elevation when ordering "Stop" so as to ensure that No. 1 does relay the gun.

### **GO ON.**

No. 1 goes on firing again.

### **Tests for proficiency (portion only).**

|                              |          |   |
|------------------------------|----------|---|
| Mount Gun ....               | 20 secs. | Stores not be carried forward more than 5 yds.            |
| Load ....                    | 5 secs.  | Belt box closed but not fastened.                         |
| Unload .. ..                 | 5 secs.  | Belt correctly packed.                                    |
| Dismount Gun ..              | 15 secs. | Time taken until all Numbers are still.                   |
| Setting sights and Laying .. | 12 secs. | Time taken from "range ordered" until No. 2's hand is up. |



**Further Lessons** (Gun always loaded before each Lesson begins).

1. To teach men to develop a consistent "tap" and to adjust the traversing clamp.

Instructor demonstrates and explains how to produce a consistent "tap" when hitting a traversing handle, to move the gun's line the same amount each time. The handle should be struck with a glancing blow from the open hand, the other hand maintaining correct holding on the other handle. Men to be practised "tapping" to the right and also to the left. A strong tap with a tight clamp is better than the reverse. Men must not look at the gun whilst tapping.

2. To adjust the traversing clamp.

Instructor demonstrates and explains how to test and adjust the tightness of the clamp so that the gun's line is displaced 15 minutes each time the gunner produces his consistent "tap." Marks which subdivide 15 minutes at the distance used, are necessary to enable men to obtain this facility. Men are to be reminded that having learnt the tightness necessary, they must always test a gun whenever they take up position as No. 1 and that the marks will seldom be available for this purpose.

3. Combination of (1) and (2).

Instructor orders the No. 1 to lay on one end of a series of marks which are 15 minutes apart at the distance used, e.g., 4 inches apart at 25 yds. distance from the gun.

A suitable order would be "1,100 — left mark (or bullseye) — Lay."

On the order "Fire" the gunner fires a burst, releases pressure, taps in the required direction once, fires another burst and so on until ordered to stop.

Men are warned (in this case) not to relay on the order "Stop" so that their proficiency in "tapping" can be checked.

Men to be trained also to "tap" right and left of a point. A suitable order being "1,100 — left mark — right and left one tap — Lay" the gunner being told whether he is to regard himself as "No. 1 gun" or "No. 2," e.g., as No. 1 gun he will do his first tap to the left; if acting as No. 2 gun, the first tap will be to the right.

4. Traversing.

Instructor demonstrates and explains how to deal with a target which is not horizontal, e.g., production of the same consistent "tap" and then elevating or depressing the gun until it is "on" the line of the target. The sequence of actions being Fire — Tap — Elevate (or Depress) — Fire, etc. Men not to relay on order "Stop," so that results can be checked.

5. Swinging Traverse.

Instructor explains the method adopted when firing ball ammunition, to "sew" a line of bullets across a suitable target. Only used at relatively close range against emergency targets when "tapping" would be too slow. Difficult to teach without actual firing. Gun must move slowly — approx. 1 yard in 2 secs. at a target 25 yds. away — and clamp must not be very loose, just

sufficient to move the gun. Should the clamp be slackened right off the vibration may cause the gunner to lose control of the gun.

**IMMEDIATE ACTION AND STOPPAGES.**

The men under instruction should be placed so that they can see the position of the crank handle and the actions of the instructor. The instructor will deal with one position until all are proficient in correcting the stoppage concerned.

**Method** — Indicate a simple target and notify the range to all.

Instructor orders the men to look away from the gun. He takes position as No. 1, adjusts the gun to simulate the stoppage position and covers the breech casing and crank handle with a suitable cloth. He then orders the men to watch his actions. He commences firing, removes the crank handle covering with one hand and proceeds with the immediate action necessary. When completed, he states "Gun is firing all right" and rests. He should question the men as to the position, actions, etc. It will be necessary to repeat the demonstration and explanation to ensure that all men understand. He does not tell them the cause of the stoppage.

Two men are then ordered to assume position as Nos. 1 and 2 and to look away. The Instructor "sets up" the stoppage again and covers the crank handle. The gun is swung in the general direction of the target. He orders "Position," when the No. 1 and 2 assume their correct positions as if ready to fire. He then orders "Fire" and after a pause, removes the covering. The No. 1, assisted as necessary by the No. 2, corrects the stoppage and finally lays on the target and fires. The Instructor checks the aim (No. 1 continuing to hold the gun) and his decision, i.e., "I.A. incorrect — Aim correct" and discusses actions of the gun numbers, questioning the remainder of the men also. The remainder of the men are then practised in the same way. When dealing with a recurring phases, e.g., 1st and 3rd positions, the Instructor should lean over the gun and position the crank handle, saying "Gun fires a few rounds and stops again."

When men are proficient in all positions, the Instructor can then explain the causes of the stoppage and how they affect the working of the gun with regard to the mechanism actions.

All men should be exercised in correcting stoppages blindfolded or in darkness. In this case the aim of the man cannot be checked but he should go through the actions necessary.

Before commencing instruction the following must be understood by the men:—

Rear cover not to be opened or closed with the tangent sight up. If the crank handle will not come back in 3rd position, the front cover is to be opened and the extractor forced down.

Covers when lowered, must be fastened correctly.

Never change a lock with cartridges on the extractor — always slide them off before removing the lock from the connecting rod.

When releasing a lock spring with the lock out of the gun, ensure that the extractor is held fully up so that firing pin is opposite its hole.

A dirty gun and careless gun numbers breed stoppages.



## Crank Handle.

## Action of Gunner.

## Probable Cause.



1st position.  
Lock cannot  
come back  
far enough  
for extractor  
to drop.

Pull crank handle on to roller.  
Pull the belt.  
Let go the crank handle.  
Aim and fire.

The gun may fire and stop  
again in the same position  
after one or more rounds.  
**Should it do so —**  
Pull crank handle on to roller.  
Pull the belt.  
Let go the crank handle.  
Turn the vice pin attached to  
the fuze spring upwards  
3 half turns. Aim and fire.

When the crank handle is "let  
go" it may stop upright —  
**should it do so —**  
Pull the crank handle on to  
roller.  
Open the rear cover.  
Lift up the lock—keeping the  
extractor down.  
Ease the crank handle on to  
the check lever.  
Slide the cartridge down off  
the extractor with right  
hand.  
Change the lock and replace  
in gun. Lower the rear  
cover—keeping the crank  
handle back.  
Load—Aim and fire.

**Prevention of occurrence —** Attend carefully to all the points necessary  
before firing.



2nd position.  
Lock cannot  
go fully  
home after  
recoiling.

With upward movement of  
cupped hand, force crank  
handle on to roller and call  
for the "clearing plug."  
Raise the rear cover.  
Lift up the lock, keeping the  
extractor down and exam-  
ine the cartridge on the  
extractor.

**If it is damaged** or with a  
portion of another cartridge  
case adhering to it —  
Call out — "don't want it."  
Slide the cartridge down off  
the extractor.  
Replace the lock in the gun  
and load. Aim and fire.

**If the cartridge is correct.**  
Slide the cartridge off — re-  
place the lock in the gun,  
keeping the crank handle  
back, put the clearing plug  
in the chamber, let the  
lock go forward. Keeping  
the lock hard forward, rock  
the handle of the clearing  
plug from side to side, pull  
the crank handle back and

Weak cartridge charge.

Too heavy weight on fuze  
spring.  
Oil needed on working parts.  
Grit on working surfaces.  
Packing too tight.  
Barrel worn—recoil reduced.  
Pockets tight—wet belt.  
Friction due to cold weather.

Weak or broken gib spring  
allowing the cartridge to slip  
down and meet the face of  
the barrel breech.

A damaged cartridge or one  
which has brought out part  
of a previous cartridge which  
has separated, adhering to  
its front end.

A cartridge case which has  
become separated and left a  
portion of itself in the  
chamber.

## Crank Handle.

## Action of Gunner.

## Probable Cause.

remove the clearing plug.  
Repeat until the separated  
portion of the case is with-  
drawn. Close the rear  
cover.  
Load. Aim and fire.

**Prevention of recurrence —** If a number of separations occur — change  
the lock. Should this not suffice, place 2 washers on the connecting  
rod above the adjusting nut until time available to place them under  
it.



3rd position.  
Extractor  
cannot rise  
to highest  
position.  
If slide of  
feed block  
is jammed—  
a fault in  
the feed is  
indicated.

Raise crank handle slightly  
and hold it.  
Pull the belt.  
Let go the crank handle and  
knock it down once to the  
check lever.  
Aim and fire.

**Prevention of recurrence —** Watch the condition of the  
cartridges in the belt and ensure that they are kept in  
line and regular.

**The same condition may  
occur after the gun fires  
one or more rounds.**

Raise the crank handle  
slightly and hold it.  
Pull the belt.  
Let go the crank handle and  
strike it down once to the  
check lever.  
Unload the gun—pull the  
crank handle on to the  
roller—raise the rear cover  
and oil the working parts.  
Lower the rear cover.  
Load. Aim and fire.

Friction on the lock and  
guides, working parts, etc.

**Prevention of occurrence —** Whenever opportunity offers, keep the  
gun correctly oiled, etc.

**When the crank handle is  
struck down it may not re-  
turn to the check lever,**  
in that case —

Feel the slide of the feed  
block to see if it is jam-  
med, e.g., cannot move  
laterally. Should it be jam-  
med—call "Feed block."

Pull the crank handle on to  
the roller—raise the rear  
cover—set the horns of  
the extractor in the steps  
on the side plate cams, i.e.,  
"Hang the lock." With  
the right thumb behind  
the crank handle knob and  
the fingers on the front  
of the tail, lever back the

Badly filled belt.  
Worn or loose pockets in the  
belt.  
Belt box not in line with the  
feed block.  
Torn pockets in belt.  
Bent or broken brass strip in  
belt.



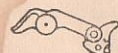
| Crank Handle. | Action of Gunner.   | Probable Cause. |
|---------------|---|-----------------|
|               | recoiling portions. No. 2 should then depress the finger pieces of the pawls and withdraw the belt until rounds clear.<br>He adjusts the rounds and the belt. No. 1, as soon as the belt moves, allows the parts to go forward by releasing his pressure.<br>No. 1 then pulls the crank handle on to the roller again, lowers the rear cover, pulls the belt and lets the crank handle go.<br>Aim and fire. |                 |

**Notes** — To get the crank handle back it may sometimes be necessary for No. 2 to force down the extractor, No. 1 opening the front cover. Recruits frequently mistake the position for a 2nd. In the case of a 2nd position the crank handle is very hard to lift up. A "high 3rd" gives a free crank handle.

**Prevention of recurrence** — Watch condition of belts and fitting of cartridges in the belts, also position of belt box. Badly filled belts generally the cause, or badly conditioned belts.

**Should the slide not be jammed**—call "Extractor" and open front cover and hold crank handle whilst No. 2 forces down the extractor, allowing No. 1 to get the crank handle back on to roller. No. 1 opens the rear cover, lifts up the lock and slides the cartridge off. No. 2 meanwhile withdrawing the belt and taking out the 1st cartridge. No. 1 then replaces the lock in the gun, closes and locks the front cover, lowers the rear cover and loads.  
Aim and fire.

Thick cartridge rim. (May be the one on the extractor or in the feed block—therefore deal with both.)



4th position. No explosion or little if any recoil from the explosion. The lock remaining forward.

|   |  |
|---|--|
| Pull the crank handle on to the roller.<br>Pull the belt.<br>Let go the crank handle.<br>Aim and fire.  | A round misfired.                                    |
| <b>When the thumb piece is pressed the gun may not fire.</b> In that case—<br>Unload, without taking the belt out of the feed block.<br>Pull crank handle on to roller—raise rear cover—take off the lock and replace it with another—close the rear cover—load.<br>Aim and fire. | Broken lock spring.<br>Broken or damaged firing pin. |

| Crank Handle. | Action of Gunner.   | Probable Cause.       |
|---------------|---|-----------------------|
|               | <b>When pulling the belt it may be seen (or felt) that more than normal comes through.</b><br>In that case—<br>Carry out full loading actions.<br>Aim and fire. | Empty pocket in belt. |

**Prevention of recurrence** in last case — Carefully inspect belts before firing and during any opportunity.

### Other stoppages may also occur.

| Crank Handle.   | Action of Gunner.   | Probable Cause.   |
|---|---|---|
| A. Crank handle resting on the roller.  | Remove the fuzee spring box.<br>Pull the belt.<br>Return crank handle to check lever.<br>Replace the broken fuzee or spring.<br>Aim and fire.<br>(If the spring is broken, make sure the new one is adjusted for weight.) | Broken fuzee or fuzee spring.   |
| B. When correcting for a thick rimmed cartridge the crank handle will not go down when loading.                       | Carry out the I.A. for 3rd position (thick rim). Unload the gun and change the lock.<br>Load. Aim and fire.<br>Unload.  | Damaged extractor grooves or Broken gib spring or Broken gib.   |
| C. Crank handle in 4th I.A. applied as for broken lock spring. Gun now only fires 2 rounds and stops in 4th position. | Change the feed block. i. Load. Aim and fire.   | i. Broken upper lever or lower lever or top pawls or spring in feed block.<br>ii. Broken bottom pawls or spring.  |
| D. Gun will not stop firing when thumbpiece pressure released. May also occur on 2nd action in loading.               | Remove a round from the belt. When the gun stops, pull the crank handle on to roller.<br>Remove the belt.<br>Let go the crank handle.<br>Change the lock.<br>Load. Aim and fire.  | Broken trigger nose or bent on tumbler or either worn badly.<br>Short arm of lock spring broken towards the bend. |



## ADVANCED MACHINE GUN HANDLING.

### 1. HOW TO HANDLE M.G. LOADS — at service weights.

Instructor to demonstrate suggested methods — others also suitable.

#### Tripod —

When walking or running — under the armpit or in front of body.

When crawling — the man to lie on his left side, using his left elbow and toes to lever himself forward, dragging the tripod with the right hand on the rear leg. Watch that the dial is not damaged.

#### Gun —

When walking or running — carried across the body with the barrel casing resting on right forearm, left hand holding left traversing handle and condenser tube. Another way is to carry the gun with muzzle up, at the right side of the body, holding with the right hand at the crosshead bracket, free end of tube pushed through handles.

When crawling — man to lie on right side, gun resting on inside of right thigh, muzzle forward. He holds the gun with his left hand and works forward levering with right elbow and left leg.

#### Condenser Can and Belt Boxes —

When walking or running — a belt box under each armpit and the condenser can held in one hand.

When crawling — put the toe of each boot inside the leather handles of a belt box, hold the condenser can in one hand and lever himself along using the elbow of the free arm and his heels. Normally lie on left side with legs apart.

#### To move a mounted gun which is unloaded, a short distance —

When walking or running —

No. 1 — right hand holds rear leg, left hand holds left front leg and one belt box.

No. 2 — left hand holds one belt box and right front leg, right hand holds condenser can.

When crawling — one number on each front leg, each levering himself forward and dragging the mounted gun, returning for other gear — or tripod turned about, one number drag forward by rear leg whilst other brings remaining stores.

Similar action when getting a gun down from exposed position.

Note — All articles to be at correct weights, barrel casing filled with water. Any comfortable way to move the gear may be tried as long as the nature of the load does not become obvious to the enemy or the gear damaged.

### 2. HOW TO MOUNT THE GUN ON EXPOSED POSITIONS.

Instructor demonstrates and explains all actions necessary.

#### (a) To mount and dismount the tripod.

To Mount — Crawl forward with the tripod to the indicated position. Keeping low down and on the left with his head to the front, undo the front leg jamming handles and get the front legs opened forward

by rocking the tripod. Undo the rear jamming handle and set it to get a low angle. Raise the socket upright and clamp the left front leg. The tripod will now lean to the right.

To Dismount — Loosen the left and rear jamming handles and set the rear leg to the usual sitting position angle. Work the front legs back again to their folded up position and tighten the jamming handles.

Another method is to allow the man to set his legs before crawling forward, i.e., rear leg set at suitable angle and clamped, front legs swung forward and back to a position near the elevating wheel and clamped. The man can drag the tripod by the rear leg or pass one arm under the crosshead and lever it forward to position.

#### (b) To mount and dismount the gun.

To Mount — The No. 1 will have removed both joint pins. The No. 2 should arrive just when this has been done and will then open the sliding shutter. Both men assist each other to put the gun the mounting, No. 1 supporting the barrel casing and putting in the crosshead joint pin; No. 2 holding the traversing handle nearest him and putting in the elevating joint pin. No. 1 then puts his arm around the socket under the crosshead and pulls the socket upright whilst No. 2 tightens up the right jamming handle. (No. 2 may have to assist No. 1 by pushing against the socket also). No. 1 swings around, keeping low and lies with his legs forward, right leg over the left and over the left forward leg of the tripod. No. 2 lies on his right side with his legs behind No. 1 and supports him with his right thigh and left knee.

No. 3 brings his gear forward without undoing the belt boxes or the cap of the condenser can. He brings the gear forward just far enough for No. 2 to reach it and keeps himself screened behind Nos. 1 and 2 whilst doing so, finally crawling away to a suitable position under cover nearby. No. 2 puts the stores in suitable places, takes off the cap of the condenser can and puts in the tube. He also unfastens the belt box quick releases.

To Dismount — No. 3 crawls up behind the gun numbers and receives the stores from No. 2, who has fastened all articles. No. 3 crawls clear with the stores.

No. 2 then loosens the right jamming handle. No. 1 takes out both joint pins until the gun is taken off by No. 2, he then replaces them and adjusts the tripod as already taught. No. 2 lifts the gun off and, lying on his back, passes the gun over his body on to the ground and closes the sliding shutter. He then either rolls over the gun to his correct position or crawls around the gun. He crawls clear of the position with the gun.

If cover is available nearby, Nos. 1 and 2 can crawl to it, dragging the mounted gun and dismount it comfortably under cover.

### 3. MOUNTING THE GUN ON UNEVEN GROUND.

Instructor to demonstrate and explain any necessary actions.

(a) Working under cover to a position and adjusting the legs of the tripod to suit the ground and putting the gun.



(b) Mounting the gun under cover and working it forward mounted, to the ground indicated.

(c) Dragging the mounted gun down under cover and dismounting it. When the men are practising, the following points are watched:—

The mounting to be as low as possible consistent with being able to deal with targets expected.

The rear leg must be **down** any slope met with on a gun position. The socket must be upright and mounted over the position indicated. Only the **shoes** of any leg to be in contact with the ground.

Ground under each **shoe** must be firm enough to support the mounting and not give way under the gun's vibration.

When mounted, no part of the tripod to interfere with the elevating wheel.

All variations of ground to be dealt with. Variation of position of gun numbers and stores brought out—essential that No. 1 can control gun and be reasonably comfortable whilst concealed; that No. 2 can position himself and stores effectively and attend to the belt feed, etc.

After a gun has been mounted to deal with a particular piece of ground, take it off and put the adjusted tripod on some level ground to let the men see the effect on the setting of the legs. They should then learn to judge a piece of ground by eye and set the legs accordingly beforehand.

The final stage is to teach how to bring the gun in action against a specified target (or to cover a specified amount of country) using the full team. In this stage an N.C.O. directs the various numbers where to go and how to move. An Orderly indicates the gun position when the numbers arrive with their gear and assists them to mount the gun and then indicates the target, etc., by laying the gun. He should not leave the gun to report it in action until it is loaded and ready. All numbers concerned must ensure that they conceal themselves and their gear to the fullest extent. On completion the Instructor checks up and discusses —

Whether the gun as mounted, can do the task set.

Whether the mounting is suitable for the position.

How the various stores are disposed at the gun—condenser can protected, etc.

Position of No. 1—concealment, can he handle and control the gun?

Position of No. 2—concealment, can he help No. 1 properly, see signals, etc.

Position of other numbers—concealment, etc.

Was the task done with regard to concealment, time factor, etc.?

Did the Orderly do his part efficiently?

How the position could be improved by digging, camouflage, etc.

#### OTHER MACHINE GUN EQUIPMENT.

Spare Parts Case—Oblong leather case fitted with a strap, lid and buckle. A long shoulder strap is also fitted and held to the case by sewn-on strips. The case contains, in addition to a spare lock, the tools necessary for gun adjustments and a proportion of spare

parts, considered as a "1st Aid" kit for the gun in action. A tin of oil is also fitted in the case.

Belt box—Rectangular steel box fitted with double loop handles of leather. The lid fits snugly over box sides and is secured by a quick release strap working under a retaining staple on the front of the box. The lid is jointed in the middle and may be operated half open only, in bad weather.

Belt—Fabric connected by brass strips which form pockets in the fabric and act as guides for the cartridges. Service belts contain 250 pockets. Drill belts are made up of damaged service belts and contain 25 pockets. Belts are fitted at each end with a brass tag to facilitate loading into feed block. Stripless belts are also on issue, the pockets being sewn or formed in the belt fabric. These belts are fitted with long wire loops at the ends instead of brass tags. They are factory filled and issued in sealed-down tin containers with pull-off lids. Two containers fit in a special wooden box which has carrying handles of web and a quick opening lid. A filled belt of 250 rounds in the normal metal belt box weighs approx. 21 lbs.

Condenser Can—Normal 2 gal. petrol can fitted with metal filler which is clipped to the top of the can and secured by a chain. Weight—filled, approx. 25 lbs.

Condenser Tube—6 ft. length of strong hose fitted at one end with a quick release device for attachment to the adapter on the steam escape boss of the barrel casing. The free end of the tube is placed in the condenser can below the level of the water.

Spare Parts Box—Issued on scale of 1 per section (2 guns). Contains, in addition to 2 spare feed blocks, various spare parts and tools, including a spare tangent sight.

Bar Foresight—An engraved flat bar graduated to 7 degrees each side of a zero and fitted with legs and a clamping screw for attachment to the gun foresight protectors. A sliding foresight with protectors is attached to the bar and clamped in position by a wing nut. Divisions on the bar are in multiples of 10 minutes. The bar foresight is used to give deflection allowances in indirect and night firing series. The bar foresight is carried in a web pouch, normally attached to the sling of the clinometer case.

Clinometer—A graduated arc, fitted with a bubble and operated by milled and engraved collars and mounted on a base which conforms to the breech casing top edges when the rear cover is raised. Degrees are shown on the arc and minutes on the end collars, one of which is read for elevation; the other for depression. An indicating arrow on the base shows the direction in which the clinometer should be fitted to the gun. No. 1 maintains correct holding (with the rear cover raised) whilst No. 2 places the clinometer on the gun and operates the elevating wheel to bring the bubble central in its run. The gun elevation can also be checked in a similar manner, except that the operating collar is turned to control the bubble. The clinometer is carried in a special case, fitted with a leather sling. It is mainly used to place the necessary elevation on the gun for indirect and night firing series. It should always be set at zero when not required for use.



Night Firing Lamp — Two patterns are issued. (1) A box containing 2 lamps, a reel with the necessary lengths of flex for each lamp and control devices. Two aiming posts of an extendable type form portion of the lamp set when issued. (2) A box containing a single lamp with a short flex connection; a "pull" switch is fitted and a length of cord on a reel included. Anchoring devices are incorporated on the box. In this type, the box is positioned close to the "planted" aiming post and anchored; the cord is attached to the switch and the reel brought back close to the N.C.O. in charge at the gun, and controlled by a spare gun number. In the case of the former type, the flex and lamp are reeled out to (or with) the aiming post, the control being at the box itself, positioned centrally between the guns. Very great care is essential, in the case of the first-mentioned type, to ensure that connection is maintained between the lamp, flex and control box.

In both types, dry cell batteries provide the necessary power for illuminant.

Aiming Post — Two types are issued. (1) A vertically extendable type fitted with an aiming mark and a lamp bracket in rear. (2) A hinged type fitted with a plain white disc and carrying a fitting to accept the lamp bracket. The latter type is the more recent and more efficient. Aiming posts are used to maintain line and elevation in indirect and night firing series.

Zero Post — A plain circular steel post with a ring top and sharpened point. Used in connection with indirect fire arrangements.

Other items of a more technical nature are also issued — e.g., Director, Field Plotter, Slide Rule.



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